STATE OF CALIFORNIA **EMPLOYMENT TRAINING PANEL**

M e m o r a n d u m

To: Panel Members Date: August 27, 2004

From: Creighton Chan, Manager Analyst: T. Teles

Subject: PROPOSED AMENDMENT NUMBER 2 FOR **ALAMEDA COMPUTER CENTER, INC.**

CONTRACTOR:

- Multiple Employer: Training Agency
- Training Project Profile: Job Creation:Training Of Unemployed Workers
- Legislative Priorities: Displaced/Potentially Displaced Workers
- Type of Industry: Various Industries
- Repeat Contractor: Yes
- ETP Trainees Represented by Union: No
- Name and Local Number of Union Representing ETP Trainees: N/A

CONTRACT:

- Program Costs:

Present Program Costs:	$611,250
Amendment Program Costs +:	$251,250
Total Program Costs:	$862,500

- Multiple Employer Support:

Present Contract Support (8 %):	$39,100
Amendment Support (8 %):	$16,075
Total Support:	$55,175

- Substantial Contribution:

Present Contract Contribution:	$0
Amendment Contribution +:	$0

Total Contributions: $0

- Total ETP Funding: $917,675
- In-kind Contribution: $496,301
  - *Trainee Wages Paid During Training*

Present Contract: $0

Amendment: $0

- *Other Contributions:*

Present Contract: $361,294

Amendment: $135,007

- *Total Contribution*

Present Contract: $361,294

Amendment: $135,007

- *Maximum Contractor Charge To Participating Employers*

Present Contract: $0

Amendment: $0

- Reimbursement Method: Fixed-Fee
- County(ies) Served: Placer, Sacramento, and Solano Counties

INTRODUCTION:

Founded in 1991, Alameda Computer Center, Inc. (ACC), is a training agency providing computer-related technical skills training. The school is licensed and regulated by the State of California Bureau of Private Postsecondary and Vocational Education. ACC has training locations in Sacramento and Oakland and is a small business that is 100 percent minority and woman-owned and operated.

The Panel approved the ETP Agreement in May 2003 to train and place 100 new-hires as Computer Technicians and 25 new-hires as Network Cable Technicians. This Amendment proposes to provide training and placement for 50 additional trainees, 25 as Computer Technicians and 25 as Network Cable Technicians. According to the Contractor, ACC has formed a partnership with 25 new employers in the Sacramento area. Many of these employers are expanding their facilities or have relocated to the area due to lower rents and overhead which allows them to create new positions. The Contractor is requesting funding to train more unemployed persons to meet employer demand for Computer and Network Cable Technicians.

The Contractor reports that 100 percent of the training is completed in Job 1 and 68 trainees, out of the 100 maximum, have been placed for a 68 percent placement rate. Training for Job 2 trainees ended on July 2, 2004, and 20 trainees completed the training. Of the 20 that completed training, out of 25 maximum to place, 10 have been placed for a 40 percent

placement rate. The Contractor explained that Alameda Computer Center staff will continue to provide placement services for the trainees that have not been placed.

MEETING ETP GOALS AND OBJECTIVES:

Alameda Computer Center, Inc. proposes training that will further the following ETP goals and objectives:

1) Target available ETP funds to train unemployed workers in occupations where employer demand exists.

2) Provide unemployed workers with advanced technical skills in demand by California employers and which will lead to secure jobs with long-term career opportunities.

TRAINING PLAN TABLE:

Grp/Trainee Type	Types Of Training	No. Retain	No. Class/ Lab Videocnf. Hrs	No. CBT Hrs.	No. SOST Hrs.	Cost Per Trainee	Hourly Wage After 90 Days
PHASE I - Job Number 1 New Hire	Computer Skills	100	180-520	0	0	$5,107	*$10.50-$22.50
PHASE I - Job Number 2 New Hire	Computer Skills	25	180-520	0	0	$5,586	*$11.00-$45.00
					Prevalent Hourly Wage $15.56		
					Average Cost Per Trainee $5,203		
Health Benefits Used To Meet ETP Minimum Wage: *Health benefits may be applied to the base wage in order to meet the minimum hourly wage.					**Turnover Rate** Shall not exceed 20% annually.		**% Of Mgrs & Supervisors To Be Trained:** N/A
Other Employee Benefits: Other employee benefits vary by employer.							

Grp/Trainee Type	Types Of Training	No. Retain	No. Class/ Lab Videocnf. Hrs	No. CBT Hrs.	No. SOST Hrs.	Cost Per Trainee	Hourly Wage After 90 Days
PHASE II - Job Number 3 New Hire	Computer Skills	25	180-520	0	0	$5,107	*$10.50-$22.50
PHASE II - Job Number 4 New Hire	Computer Skills	25	180-520	0	0	$5,586	*$11.00-$45.00

Prevalent Hourly Wage

$15.56

Average Cost Per Trainee

$5,203

Health Benefits Used To Meet ETP Minimum Wage:

*Health benefits may be applied to the base wage in order to meet the minimum hourly wage of $9.13 in Placer County, $10.02 in Sacramento County, and $9.13 in Solano County.

Turnover Rate

Shall not exceed 20% annually.

% Of Mgrs & Supervisors To Be Trained:

N/A

Other Employee Benefits:

Other employee benefits vary by employer.

COMMENTS / ISSUES:

- ***Production During Training***

  Contractor agrees that during ETP-funded training hours, trainees will not produce products or provide services which will ultimately be sold.

- ***Recruitment***

  According to the Contractor, ACC will be recruiting trainees from the Employment Development Department offices in Placerville, Roseville, Sacramento, Lodi, Fairfield, West Sacramento, and Woodland. ACC will also recruit trainees from the One-Stop Centers in Sacramento, Citrus Heights, Galt, Mather, and Rancho Cordova.

COMMENTS / ISSUES: (continued)

- ***Composition of Classes***

  The classes will be comprised of approximately 60 percent ETP-funded trainees. The remaining 40 percent are funded through vocational rehabilitation programs, county funds, or other state-funded programs. No other government or private funds will be used to fund the training of ETP trainees.

- ***Justification of Training Costs***

  The Alameda Computer Center's new-hire program cost per trainee averages $5,107 for Job 3 and $5,586 for Job 4 trainees. Reimbursement is based on the fixed hourly rate of $15.00 multiplied by the average number of hours of training (320 and 350) with an additional 8 percent for recruitment and assessment. The average number of training hours is based on ACC's past experience training ETP trainees under three prior Agreements and feedback from participating employers on the job readiness of trainees completing the program. The unemployed workers entering this program have limited knowledge of computer technology, may have had limited educational opportunities, and lack experience in the computer industry. In order to get positions with long-term career potential, these individuals must receive significant training hours in order to meet industry standards and to receive industry certification. Panel staff has reviewed the ACC published rates and determined that the Center's tuition charges are equal or greater than the hourly rated funded by ETP.

  The current ETP minimum wage for new-hire programs in Sacramento County is $10.02 and for Placer County is $9.13 per hour. According to ACC, the majority of its ETP trainees are hired at a wage higher than ETP's minimum wage. ACC reports that trainees placed in this Agreement to date average $13.50 per hour and the average wage of the trainees placed in the previous Agreement was $18.00 per hour. Although it is early in this Agreement, five trainees have had salary increases of seven percent after the retention period, to an average of $14.50 per hour. The Contractor also reported that in the last Agreement, 20 new-hire trainees received an increase of ten percent which increased the average salary to $20.00 per hour.

PROPOSED ACTION:

Staff recommends that the Panel approve this Amendment if it finds that the wages paid to trainees justifies the cost per trainee.

NARRATIVE:

Under this Amendment, ACC will train an additional 50 trainees at its Sacramento facility. Job 3 training for the generic occupational title of Computer Technician will meet the needs of businesses seeking employees with specialized skills in computer hardware, service and repair, including network or A+ certification. Advancements in computer technology require businesses to update and/or replace their computer equipment with more complex equipment. As this equipment is replaced and/or updated, there is an urgent need for skilled technicians. In order to ensure that the employees they hire meet industry standards, many participating employers are seeking individuals who have achieved a type of certification in computer technology called

NARRATIVE: (continued)

A+ or Network + certification. Trainees completing Job 3 training will be qualified to meet these industry certification requirements.

Training will be tailored for each unemployed individual based on their educational background and work experience and the needs of participating employers. Training will range from 180 to 520 hours of classroom/laboratory training. Coursework will include the features and functions of computer and network operating systems; skills needed to install, configure, repair, and troubleshoot hardware and software peripherals and protocols; and new technologies such as wireless networking.

Training for the Network Cable Technicians (Job 4) will also be tailored for each unemployed individual based on their educational background and work experience and will range from 180 to 520 hours of classroom/laboratory training. Upon completion of training, the trainee will be able to identify the basic cabling industry components and protocols and have the skills to install, configure, and troubleshoot basic cabling and network peripherals and protocols. Training will include new technologies in cable systems testing and troubleshooting, including fiber-optic cabling.

Under this Amendment, ACC will not be conducting training at the Oakland location. However, the facility will continue to provide placement services in the San Francisco Bay area for the trainees that attended classroom training in Oakland and for the trainees who will be trained in Sacramento if they expand their job search area.

Employer Demand

Panel policy requires multiple employer contractors provide evidence of employer demand for training.

The Contractor reports that companies are relocating to Sacramento area because of lower rents and overhead which allows companies to open new positions and hire additional trainees from ACC. Eight companies in the Sacramento area, comprising the core group of participating employers, expect to have 47 openings for individuals with the skills provided by ACC. All of the core participating employers are ETP-eligible for the purpose of a new-hire program. Of this core group, 28 percent are small businesses employing fewer than 100 workers.

In addition to the core group of employers who plan to hire ETP trainees, demand for this training is supported by labor market information generated by EDD's Labor Market Information Division (LMID). Labor market information for the Sacramento Metropolitan Statistical Area lists Computer Support Specialists and Network and Computer Systems Administrators as the Fastest Growing Occupations for 2004 with above three percent annual projected growth. The curriculum for Job 3 trainees fills this employer need. EDD's report on Sacramento County - Occupations with Greatest Growth, 2001-2008 lists Telecommunications Line Installers and Repairers as a demand occupation with job growth predicted at 29 percent. Demand for workers with cable installation skills as provided in Job 4 training is further generated by new home construction and increased consumer demand for broadband cable Internet connections.

Employer Commitment to Training for New Hires

After completion of training and during the 90-day retention period, employers will provide additional training. The Contractor reports that employers provide training in company policies, procedures, processes, job-specific duties, and new-hire orientation.

NARRATIVE: (continued)

Method of Assessing Training Needs for New Hires

The Contractor reports that ACC has a consortium of employers whom it meets with to gather and review current trends in the field of computerized information technology. Also, a checklist is provided to the employers to evaluate the performance of new-hire trainees, rating them on their technical skills and subject knowledge. The evaluation also requests comments regarding needed improvements to the training. Based upon the evaluations, ACC makes changes to the curriculum. If the employers feel that the new-hire needs additional training, ACC will provide the additional skills training at no cost to the employer.

ACTIVE PROJECTS:

The following are current project statistics:

ACTIVE PROJECTS						
Agreement Number	**Agreement Amount**	**Term**	**Planned Number To Be Retained**	**Number Enrolled**	**Number Completed Training**	**Number Retained For 90 Days**
ET03-0337	$650,350	06/02/03-06/01/05	125	198	*152	*15

*According to the Contractor, 152 trainees completed training and 75 trainees have been placed in employment. Of the 75 placed, 15 completed the retention period and 60 trainees are in the retention period. The 75 placements represent a 60 percent placement rate for the original 125 maximum to place.

Class/Lab
HOURS COURSES
180-520

MODULE (1) HARDWARE TECHNOLOGY AND COMPONENTS

1. INTRODUCTION TO INSTALLATION, CONFIGURATION & UPGRADING

1A. Introduction to Installation, Configuration & Upgrading
- System board & Power supply
- Processor/CPU (Central Processing Unit) & Memory
- Storage devices & Firmware
- LCD (portable systems) & Ports
- PDA (Personal Digital Assistant)

1B. Basic procedures for adding and removing field replacement modules for both desktop and portable systems:
- System board & Storage device
- Power supply & Processor /CPU
- Memory & Input devices
- Hard drive & Keyboard
- Video board & Mouse
- Network Interface Card (NIC)

1C. Portable system components
- Analog Connector adapter
- Digital Camera
- Digital Connector controller
- Personal Computer Card
- Pointing Devices

1D. Procedures for device installation and configuration.
- Standard settings
- Modems & Floppy drive controllers
- Hard drive controllers & ports
- Infrared ports
- Hexadecimal/Address
- Common peripheral ports, associated cabling, and their connectors
- Cable types & Cable orientation
- Serial versus parallel & Pin connections
- Installing and configuring devices
- Device per channel
- Primary/Secondary

1E. Proper procedures for installing and configuring devices
- Address/Termination conflicts
- Cabling

Types (example: regular, wide, ultra-wide)
Internal versus external
Expansion slots,
Jumper block settings (binary equivalents)
Proper procedures for installing and configuring peripheral devices
Methods of upgrading systems performance, procedures for replacing basic subsystem components, unique components and when to use them.

2. DIAGNOSING AND TROUBLESHOOTING

Processor/Memory symptoms
Mouse & Floppy drive
Parallel ports & Hard Drives
CD-ROM & DVD
Sound Card/Audio & Monitor/Video
Motherboards & Modems
NIC & CMOS(Complementary Metal-Oxide Semiconductor)
Power supply & Slot covers
Post audible/visual error codes
Troubleshooting tools, e.g., multimeter
Cables & Keyboard
Peripherals

2A. Basic troubleshooting procedures and how to elicit problem

Symptoms from customers.
Troubleshooting/isolation/problem determination procedures
Determine whether hardware or software problem
Gather information from user regarding
Customer Environment
Symptoms/Error Codes
Situation when the problem occurred

3. PREVENTIVE MAINTANCE

Liquid cleaning compounds
Types of materials to clean contacts and connections
Non-static vacuums (chassis, power supplies, fans)
UPS (Uninterruptible Power Supply) and suppressors
Determining the signs of power issues
Proper methods of storage of components for future use
Potential hazards and proper safety procedures relating Lasers
High-voltage equipment
Power supply & Batteries
Toner kits/cartridges & Chemical solvents and cans
MSDS (Material Safety Data Sheet)
& ESD (Electrostatic Discharge) precautions & procedures
What ESD can do, how it may be apparent, or hidden
Common ESD protection devices
Situations that could present a danger or hazard

3A. Distinguish between the popular CPU (Central Processing Units) chips basic characteristics

Popular CPU chips (Intel, AMD, Cyrix)
Characteristics & Physical size
Voltage & Speeds
On board cache or not & Sockets
SEC (Single Edge Contact)

4. RAM terminology, their locations, and physical characteristics
EDO RAM (Extended Data Output RAM)
DRAM (Dynamic Random Access Memory)
SRAM (Static Random Access Memory RAM)
RIMM (Rambus Inline Memory Module 184 Pin)
VRAM (Video RAM) & DRAM (Synchronous Dynamic RAM)
WRAM (Windows Random Accelerator Memory Card)
Locations and physical characteristics:
Memory bank & Memory chips (8-bit, 16-bit, and 32-bit)
SIMMS (Single In-line Memory Module)
DIMMS (Dual In-line Memory Module)
Parity chips versus non-parity chips

5. MOTHERBOARDS/PROCESSORS AND MEMORY

5A. CMOS (Complementary Metal-Oxide Semiconductor) and how to change its basic parameters.
Printer parallel port—Uni. bi-directional, disable/enable
Serial port—memory address, interrupt request, disable
Floppy drive—enable/disable drive or boot, speed, density
Hard drive—size and drive type & Memory—parity, non-parity
Boot sequence & Date/Time
Passwords Plug & Play

5B. Printer operations and printer components
Laser & Inkjet
Dot Matrix & Types of printer connections and configurations
Parallel & Network
Infrared
Serial & Feed and output
Errors (printed or displayed)
Paper jam & Print quality
Safety precautions & Preventive maintenance

5C. Basic networking concepts, network works & ramifications of repairs
Installing and configuring network cards
Network access & Full-duplex, half-duplex
Cabling—Twisted Pair, Coaxial, Fiber Optic, RS-232
Ways to network a PC & Physical Network topographies
Increasing bandwidth & Loss of Data
Network slowdown & Infrared & Hardware protocols

5D. Operating Systems functions, structure, and major system files to navigate the operating system and technical information

- Major Operating System functions
- Create folders & checking (OS) Operating Systems Version
- Major Operating System components
- Explorer & My Computer
- Control Panel & Contrasts between Windows 9X and Windows 2000

5E. System, Configuration, and User Interface files

5F. Memory management

- Conventional & Extended/upper memory
- High memory & Virtual memory

5G. Windows 9x Computer Management

5H. Windows 2000 Computer Management

5I. Concepts and procedures for creating, viewing and managing files, directories and disks

- File attributes - Read Only, Hidden, System, and Archive attributes
- File naming conventions (Most common extensions)
- Backup/Restore & Partitioning/Formatting/File System
- Windows-based utilities
- Scandisk & Device manager
- System Manager & Computer Manager
- Automatic Skip Driver

5J. Procedures for installing Windows 9x, and Windows 2000 for bringing the software to a basic operational level.

- Start Up & Partition
- Format drive & Loading drivers
- Run appropriate set up utility
- Upgrading Windows 95 to Windows 98
- Upgrading from Windows NT Workstation 4.0 to Windows 2000
- Replacing Windows 9x with Windows 2000
- Dual boot Windows 9x/Windows NT 4.0/2000
- Startup disk & Safe Mode
- Files required to boot & Creating emergency repair disk
- Windows 9x Plug and Play and Windows 2000
- Procedures for set up and configuring Windows printing subsystem.
- Setting Default printer & Installing/Spool setting
- Network printing

6. Diagnosing and Troubleshooting:
Recognize common problems and determine how to resolve them.

- Eliciting problem symptoms from customers
- Having customer reproduce error as part of the diagnostic process
- Identifying recent changes to the computer environment from the user
- Troubleshooting Windows-specific printing problems

Print spool is stalled & Incorrect/incompatible driver for print
Incorrect parameter & Other Common problems
General Protection Faults & Illegal operation
Invalid working directory & System lock up
Option (Sound card, modem, input device) or will not function
Application will not start or load
Cannot log on to network (option – not functioning)
TSR (Terminate Stay Resident) programs and virus
Applications don't install & Network connection
Viruses and virus types & Sources (floppy, emails, etc.)
How to determine presence

7. Networks Capabilities of Windows
   Sharing disk drives
   Sharing print and file services & Network type and network card
   Installing and Configuring browsers & Configure Operating System for network connection

7. A. Concepts and capabilities relating to the Internet and basic procedures for setting up a system for Internet access

8. Internet Capabilities and Procedures
   Introduction to the World Wide Web
   Use the Internet Explorer 5 Web Browser
   Search the Web
   Intro to Outlook Express
   Use Outlook Express & Edit Outlook
   Using the World Wide Web
   Creating a Web Page
   Overview of Windows

COURSES

HOURS
Class/Lab

B. NETWORK + SERVICE TECHNICAIN

180-520

Introduction to Networking

What is a Network? /The Functions of a Network
Peer-to-Peer Versus Client/Server Networks
Distributed and Centralized Computing
Various Network Topologies
Physical and Logical Topologies
Bus, Star, Ring, Mesh, and Wireless Topologies
Networking Standards

Cabling and Connectors

Media Considerations: Media Interference, Bandwidth, Media Length, Security, Installation, and Repair
Baseband Versus Broadband Signaling
Simplex, Half-Duplex, and Full-Duplex
Common Network Cable: Cable Media and Wireless Media
Media Connectors
Features and Characteristics of Ethernet Standards
Choosing the Appropriate Media Connector for Adding Clients to an Existing Network

Networking Components and Devices

Hubs
Switches and Switching Methods
Working with Hubs and Switches: Ports, Cables, Indicator Lights, Rack MountDevices, Stackable Devices, Freestanding Devices, and Managed Hubs and Switches
Bridges
Routers: Routable Protocols, Routing Protocols, and Dedicated Hardware Versus Server-Based Routers
Gateways
Wireless Access Point (WAPs)
Modems and Modem Connection Speeds
Network Cards (NICs): Types and Installation
Terminal Adapters
System Area Network Cards
Identifying Addresses

The Open Systems Interconnect (OSI) Model

Why Do We Need a Network Model?
OSI Reference Model: Physical Layer, Data-Link Layer, Network Layer, TransportLayer, Session Layer, Presentation Layer, and Application Layer
The Layers at Which Devices Operate: Hubs, Switches, Bridges, and Routers

Overview of Network Protocols

Introduction to Protocols: Function of Protocols and Mapping Protocols to the OSI Model
Transmission Control Protocol/Internet Protocol (TCP/IP): The Protocol Suite, Standards, Addressing, Interoperability, Naming, Routing Protocols, and Mapping to the OSI Model
Internet work Packet Exchange/Sequenced Packet Exchange
The Protocol Suite, Addressing, Interoperability, Naming, and Mapping to the OSI Operating Systems Interconnect Model
AppleTalk: Addressing, Interoperability, Routing, Naming, and Mapping to the OSI Operating Systems Interconnect Model
Addressing and Mapping to the OSI Operating Systems Interconnect Model
Protocol Overview and Comparison

Working with Transmission Control Protocol/Internet Protocol (TCP/IP)

TCP/IP Transmission Control Protocol/Internet Protocols:
Ports
TCP/IP-Based Network Services
Addressing: Addressing Principles, Address Classes, and Subnet Mask Assignment
Subnetting
Reasons to Subnet
Default Gateways
Identifying the Differences between Public and Private Networks

Wide Area Network (WAN) Technologies

Introduction to WAN Technologies: Private and Public Networks/Packet, Circuit, and Message Switching
WAN Technologies: Dial-up Modem, Lines, Frame Relay

Remote Access and Security Protocols

Remote Access Protocols and Services
Security Protocols
Types of Remote Access: Dial-up

Network Operating Systems and Clients

Introduction to Network Operating Systems/Choosing a Network Operating System
Windows 4: Domains and Workgroups, System Requirements, File Systems, Monitoring and Performance Tools, User Management Basics, Verifying Network Settings, Authentication, File and Print Services, Application Support, and Security
Windows 2000: Active Directory and Domains, System Requirements, File Systems, Monitoring and Performance Tools, Managing Windows 2000 Disk Drives, User Management Basics, Authentication, File and Print Services, Application Support, and Security
Novell NetWare: System Requirements, File Systems, Monitoring and Performance Tools, User Administration, Server Configuration, Viewing and Changing a Network Configuration, Authentication, File and Print Services, Application Support, and Security
Linux: System Requirements, File Systems, Monitoring and Performance Tools, Managing Linux Disk Drives, User Management Basics, Verifying Network Settings, Authentication, File and Print Services, Application Support, and Security
Operating System Interoperability: Using Windows with NetWare; Using Windows and Linux Servers; and Using NetWare and Linux Servers
Operating System Client Support: Windows, NetWare, and Linux

Client Operating Systems: Windows, Linux, and Macintosh

Fault Tolerance, Disaster Recovery

Understanding Fault Tolerance
Disaster Recovery/Backup Methods
Network Storage: File Server Storage

Configuring Network Connectivity

Configuring Remote Connectivity: Physical Connections, Protocols, Software, Dial-up Access, and Security
Selecting Network Configuration Settings: Choosing, Installing, Connecting, Testing, Troubleshooting, and Configuring
Configuring Clients to Access Servers: Windows, Novell, and Unix/Linux
Adding, Modifying, or Removing Network Services

Securing the Network

Threats to Security/Network Administrator Responsibilities
Physical and Logical Security
Firewalls
Proxy Servers
Understanding How Security Affects a Network: Blocking Port Numbers, Encryption, and Auditing

Troubleshooting Connectivity

Troubleshooting Tools
Troubleshooting in a Small Office/Home Office Environment: Cable, Home Satellite, Wireless
Using Technical Support
Troubleshooting Remote Connectivity Errors: Authentication Failure, Physical Connectivity, and Protocol Configuration

Troubleshooting Tools and Utilities

Selecting the Appropriate Tool for Wiring: Wire Crimpers, Punchdown Tools, Tone Generators, Media Testers, and Hardware Loopback Connectors
Interpreting Visual Indicators
Using Diagnostic Utilities

Troubleshooting Procedures and Best Practices

Troubleshooting Basics: Servers and Workstations
The Art of Troubleshooting: Establishing the Symptoms; Identifying the Affected Area; Establishing What Has Changed; Selecting the Most Probable Cause; Implementing a Solution; Testing the Result; Recognizing the Potential Effects of the Solution; and Documenting the Solution
Troubleshooting Topology Errors: Bus, Star, Ring, Mesh, and Wireless
Troubleshooting Client Connectivity Errors: Protocol, Authentication, Permission, and Physical Connectivity
Troubleshooting Wiring- and Infrastructure-Related Problems
Troubleshooting Checklists: Cable Problems, Network Connectivity, Network Printing and Data Access

HOURS
Class/Lab
Hours 180-520

COURSE

MODULE (I) CABLING TECHNOLOGY AND COMPONENTS

Introduction to Data Cabling

Rules of Data Cabling
The Importance of Reliable Cabling/The Cost of Poor Cabling
Proprietary Cabling Systems
Cabling and the Need for Speed/Types of Communications Media: Unshielded Twisted Pair, Shielded Twisted Pair, Coaxial, and Fiber Optic
Cable Design: Plenum, Riser, General Purpose, Limited Use Cable Jackets, Wire Insulation, Twists, and Solid Conductors Versus Stranded Conductors
Data Communications: Bandwidth, Frequency, and Data Rate
What Slows Down Your Data: Hindrances to High-Speed Data Transfer, Attenuation (Loss of Signal), and Noise (Signal Interference)
The Future of Cabling Performance

Cabling Specifications and Standards

Structured Cabling and Standardization/Standards and Specifying Organizations
A Cabling Standard
A Purpose and Scope; Subsystems of a Structured Cabling System; Media and Connecting Hardware Performance; Telecommunications Systems Bulletins; and Other Standards and Bulletins
Classification of Applications and Links
Anixter Cable Performance Levels Program
Other Cabling Technologies: The IBM Cabling System; Lucent Cabling System; Digital Equipment Corporation Deconnect; and Integrated Building Distribution System

Choosing the Correct Cabling

Topologies: Star, Bus, and Ring
Optical Fiber, and Future-Proofing
Network Architectures: Ethernet, Token Ring, Fiber Distributed Data Interface, Asynchronous Transfer Mode (ATM), and 100VG-Any LAN Local Area Network
Network-Connectivity Devices: Repeaters, Hubs, Bridges, Switches and Routers.

Cable System and Infrastructure Constraints

Where Do Codes Come From?: The United States Federal Communications Commission, The National Fire Protection Association, Underwriters Laboratories, and Codes and the Law
The National Electrical Code: NEC Chapter 1 General Requirements, NEC Chapter 2 Wiring and Protection, NEC Chapter 3 Wiring Methods and Materials, NEC Chapter 5 Special Occupancy, NEC Chapter 7 Special Conditions, and NEC Chapter 8 Communications Systems
Knowing and Following the Codes

Cabling System Components

The Cable: Horizontal and Backbone Cables, Modular Patch Cables, and Picking the Right Cable for the Job
Wall Plates and Connectors
Cabling Pathways: Conduit, Cable Trays, Raceways, and Fiber-Protection Systems
Wiring Closets: Recommendations for Wiring Closets, Cabling Racks and Enclosures, Cross-Connect Devices, and Administration Standards.

COURSE
MODULE (II) NETWORK MEDIA AND CONNECTORS

Copper Cable Media

Types of Copper Cabling: Major Cable Types Found Today, Picking the Right Patch Cables, and Why Pick Copper Cabling?
Best Practices for Copper Installation: Following Standards, Planning, and Installing Copper Cable
Copper Cable for Data Applications
Copper Cable for Voice Applications
Testing: Tone Generators and Amplifier Probes, Continuity Testing, Wire-Map Testers, Cable Certification, and Common Problems with Copper Cabling

Wall Plates

Wall-Plate Design and Installation Issues: Manufacturer System, Wall-Plate Location, Wall-Plate Mounting System, and Fixed-Design or Modular Plate
Fixed-Design Wall Plates: Number of Sockets, Types of Sockets, and Labeling
Modular Wall Plates: Number of Sockets, Wall-Plate Jack Considerations, and Labeling
Biscuit Jacks: Types of Biscuit Jacks, Advantages of Biscuit Jacks, and Disadvantages of Biscuit Jacks

Connectors

Twisted-Pair Cable Connectors: Patch-Panel Terminations, Modular Jacks and Plugs, and Shielded Twisted-Pair Connectors
Coaxial Cable Connectors: F-Series Coaxial Connectors, N-Series Coaxial Connectors, and the BNC Connector
Fiber-Optic Cable Connectors: Fiber-Optic Connector Types and Installing Fiber-Optic Connectors

Fiber-Optic Media

Introduction to Fiber-Optic Transmission
Advantages of Fiber-Optic Cabling: Immunity to Electromagnetic Interference (EMI), Higher Possible Data Rates, Longer Maximum Distances, and Better Security
Disadvantages of Fiber-Optic Cabling: Higher Cost and Difficult to Install
Types of Fiber-Optic Cables: Composition of a Fiber-Optic Cable and Additional Designations of Fiber-Optic Cables
Fiber Installation Issues: Components of a Typical Installation and Fiber-Optic Performance Factors

Unbounded (Wireless) Media

Infrared Transmissions: How Infrared Transmissions Work (Point to Point and Broadcast), Advantages and Disadvantages of Infrared, and Examples of Infrared Transmissions

Radio-Frequency (RF) Systems: How RF Works (Low Power, Single Frequency, High Power, Single Frequency, and Spread Spectrum), Advantages and Disadvantages of RF, and Examples of RF

Microwave Communications: How Microwave Communication Works (Terrestrial and Satellite), Advantages and Disadvantages of Microwave Communications, and Examples of Microwave Communications.

COURSE
MODULE (III) CABLING DESIGN AND INSTALLATION

Cabling-System Design and Installation

Elements of a Successful Cabling Installation: Proper Design, Quality Materials, and Good Workmanship
Cabling Topologies: Bus, Star, Ring, Mesh, Backbones and Segments, and Selecting the Right Topology
Cabling-Plant Uses: Telephone, Television, Fire-Detection, and Security Cabling
Choice of Media
Telecommunications Closets: Local Area Network LAN Wiring, Telephone Wiring, Power Requirements
Cabling Management: Physical Protection, Electrical Protection (Spike Protection), and Fire Protection
Data and Cabling Security: EM (Electromagnetic) Transmission Regulation and Tapping Prevention
Cabling Installation Procedures: Designing the Cabling System; Scheduling the Installation; Installing the Cabling; Cable Termination; and Testing the Installation

Cable-Connector Installation

Twisted-Pair Cable-Connector Installation: Types of Connectors, Conductor Arrangement, and Connector Crimping Procedures
Coaxial Cable-Connector Installation: Types of Connectors and Connector Crimping Procedures
Fiber-Optic Cable-Connector Installation: Connector Types, Connectorizing Methods, and Connector Installation Procedures

Cable-System Testing and Troubleshooting

Installation Testing: Copper-Cable Tests and Fiber-Optic Tests
Cable-Plant Certification: Creating a Testing Regimen, Copper-Cable Certification, Fiber-Optic Certification, and Third-Party Certification
Cable-Testing Tools: Wire-Map Testers, Continuity Testers, Tone Generators, Time Domain Reflectometers (TDR), Fiber-Optic Power Meters, Fiber-Optic Test Sources, Optical Loss Test Sets and Test Kits, Optical Time Domain Reflectometers (OTDRs), Fiber-Optic Inspection Microscopes, Visual Fault Locators, and Multifunction Cable Scanners
Troubleshooting Cabling Problems: Establishing a Baseline, Locating the Problem, and Resolving Specific Problems

Overview of Networking

Participating Employers in Retrainee/New Hire Multiple Employer Contracts

Contractor's Name: Alameda Computer Center	CCG No.: ET03-0337
Reference No: 03-0244	Page 1 of 3

PRINT OR TYPE

Company: Aerojet General Corporation

Address: Hwy. 50 and Aerojet Rd.

City, State, Zip: Rancho Cordova, CA 95670

Contact Person/Title: Human Resources Manager

Telephone No.: (916) 355-4704

Collective Bargaining Agreement(s): N/A

Estimated #of employees to be retrained or hired under this Agreement: 8

Total # of full-time company employees worldwide: 10,000

Total # of full-time company employees in California: 2,500

Company: Best Buy

Address: 6110 Birdcage Center Lane

City, State, Zip: Citrus Heights, CA 95610

Contact Person/Title: Brian Bates, Manager

Telephone No.: (916) 725-1455

Collective Bargaining Agreement(s): N/A

Estimated # of employees to be retrained or hired under this Agreement: 5

Total # of full-time company employees worldwide: 100,000

Total # of full-time company employees in California: 56,000

Company: Comcast

Address: 1500 Market St.

City, State, Zip: Philadelphia, PA 19102

Contact Person/Title: Cynthis Pukatch, Human Resources Coordinator-Western Division

Telephone No.: (925) 349-1105

Collective Bargaining Agreement(s): N/A

Estimated # of employees to be retrained or hired under this Agreement: 8

Total # of full-time company employees worldwide: 68,000

Total # of full-time company employees in California: 9,000

Participating Employers in Retrainee/New Hire Multiple Employer Contracts

Contractor's Name: Alameda Computer Center	CCG No.: ET03-0337
Reference No:	Page 2 of 3

PRINT OR TYPE

Company: CyberGuys

Address: 11321 White Rock Road

City, State, Zip: Rancho Cordova, CA 95742

Contact Person/Title: Elena Bernardino, Call Center Human Resources Manager

Telephone No.: (916) 631-9000

Collective Bargaining Agreement(s): N/A

Estimated #of employees to be retrained or hired under this Agreement: 5

Total # of full-time company employees worldwide: 100

Total # of full-time company employees in California: 100

Company: Fry's Electronics

Address: 4100 Northgate Blvd.

City, State, Zip: Sacramento, CA 95834

Contact Person/Title: Human Resources

Telephone No.: (916) 286-5800

Collective Bargaining Agreement(s): N/A

Estimated # of employees to be retrained or hired under this Agreement: 2

Total # of full-time company employees worldwide: 5,950

Total # of full-time company employees in California: 4,000

Company: InfoPros-Drakeley & Smith, Inc.

Address: 6060 Sunrise Vista Drive, Suite 2180

City, State, Zip: Citrus Heights, CA 95610

Contact Person/Title: Rose Ominski, Human Resource Manager

Telephone No.: (916) 676-1565

Collective Bargaining Agreement(s): N/A

Estimated # of employees to be retrained or hired under this Agreement: 2

Total # of full-time company employees worldwide: 32

Total # of full-time company employees in California: 32

Participating Employers in Retrainee/New Hire Multiple Employer Contracts

Contractor's Name: Alameda Computer Center | CCG No.: ET03-0337

Reference No: |

PRINT OR TYPE

Company: Office Depot

Address: 6700 Folsom Blvd.

City, State, Zip: Sacramento, CA 95819

Contact Person/Title: John Hanson, Store Manager

Telephone No.: (916) 455-2741

Collective Bargaining Agreement(s): N/A

Estimated #of employees to be retrained or hired under this Agreement: 5

Total # of full-time company employees worldwide: 46,000

Total # of full-time company employees in California: 8,500

Company: Sure West Communications

Address: P.O. Box 969, 8159 Industrial Avenue

City, State, Zip: Roseville, CA 95678

Contact Person/Title: Nancy Shafer, Human Resources

Telephone No.: (916) 786-1911

Collective Bargaining Agreement(s): N/A

Estimated # of employees to be retrained or hired under this Agreement: 10

Total # of full-time company employees worldwide: 997

Total # of full-time company employees in California: 997

Company:

Address:

City, State, Zip:

Contact Person/Title:

Telephone No.:

Collective Bargaining Agreement(s):

Estimated # of employees to be retrained or hired under this Agreement:

Total # of full-time company employees worldwide:

Total # of full-time company employees in California: